PROC. ENTOMOL. SOC. WASH.
97(3), 1995, pp. 729–731

Note

Distribution of *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae) in North Carolina and Virginia

The multicolored Asian lady beetle, *Harmonia axyridis* (Pallas), was first reported to be established in the United States in Louisiana and Mississippi (Chapin and Brou. 1991. Proceedings of the Entomological Society of Washington 93: 630–635). This entomophagous lady beetle feeds on a wide variety of aphids, especially arboreal aphids, as well as some coccids and other insects (Tedders and Schaefer. 1994. Entomological News 4: 228–243). *Harmonia axyridis* was released in the United States as early as 1916 in California, and between 1978 and 1982, large numbers were released in the United States and Canada. The majority were released along the Atlantic Seaboard, including over 87,000 released near Byron, Georgia for control of aphids on pecan, but releases were also made in Louisiana, Mississippi, and Washington state (L. R. Ertle, in litt.).

The first collections of *H. axyridis* in North Carolina occurred in the fall of 1992. Reports of lady beetles aggregating on and inside houses, churches, and other structures were received through the Cooperative Extension Service, North Carolina State University. Specimens were subsequently identified by D. L. Stephan of the Plant Disease and Insect Clinic, NCSU. By December, reports had been received from 7 counties, all but one of which is in the mountain or western piedmont region of the state (Fig. 1). During the spring and summer of 1993, individual beetles were collected, coincidental with other field work, on a variety of host plants and at lights in 7 counties in NC. Fall aggregations had been reported from 2 of these counties, Cleveland and Clay (Fig. 1). Host plants in North Carolina included thistle (*Cirsium vulgare*) (Savi) Tenore, ironweed (*Vernonia* sp.), *Erigeron strigosus* Muhl. ex Willd., dock (*Rumex* sp.), wheat (*Triticum* sp.) and cotton (*Gossypium* sp.). Unidentified aphid species were seen on wheat and dock, but insect hosts were not always found associated with the lady beetles. The beetles may have been feeding on nectar from floral or extrafloral nectaries or pollen; these substances are commonly fed upon by coccinellids (Hagen. 1962. Annual Review of Entomology 7: 289–326). First reports of aggregations in Virginia came from Lee County in January 1993. *Harmonia axyridis* was collected 3 August 1993 in alfalfa during a coccinellid survey in Augusta County, VA. This is approximately 375 km (as the crow flies) from the first collection reported in Virginia. Lady beetles were also observed feeding on *Myzus persicae* (Sulzer) on tobacco (*Nicotiana* sp.) in Nottoway County, VA.

In anticipation of fall 1993 aggregations, county offices of the North Carolina Cooperative Extension Service were contacted and asked to report activity. Initial reports were received from the western counties in mid-October and continued through the end of November, with activity shifting from west to east. On Monday 18 October, county agents from Macon County, NC to Rappanhannock County, VA (a distance of about 630 km) were innundated with reports of aggregations that suddenly appeared the previous day. In the piedmont regions noticeable activity began 25 October in VA and 30 October in NC. Although to date beetles have been reported in eastern VA (to 76°30′W longitude), no reports have been received from east of about 78°W in NC.

Based on reports of homeowners and other observers, aggregating lady beetles came suddenly in large numbers, and landed on buildings, apparently searching for suitable

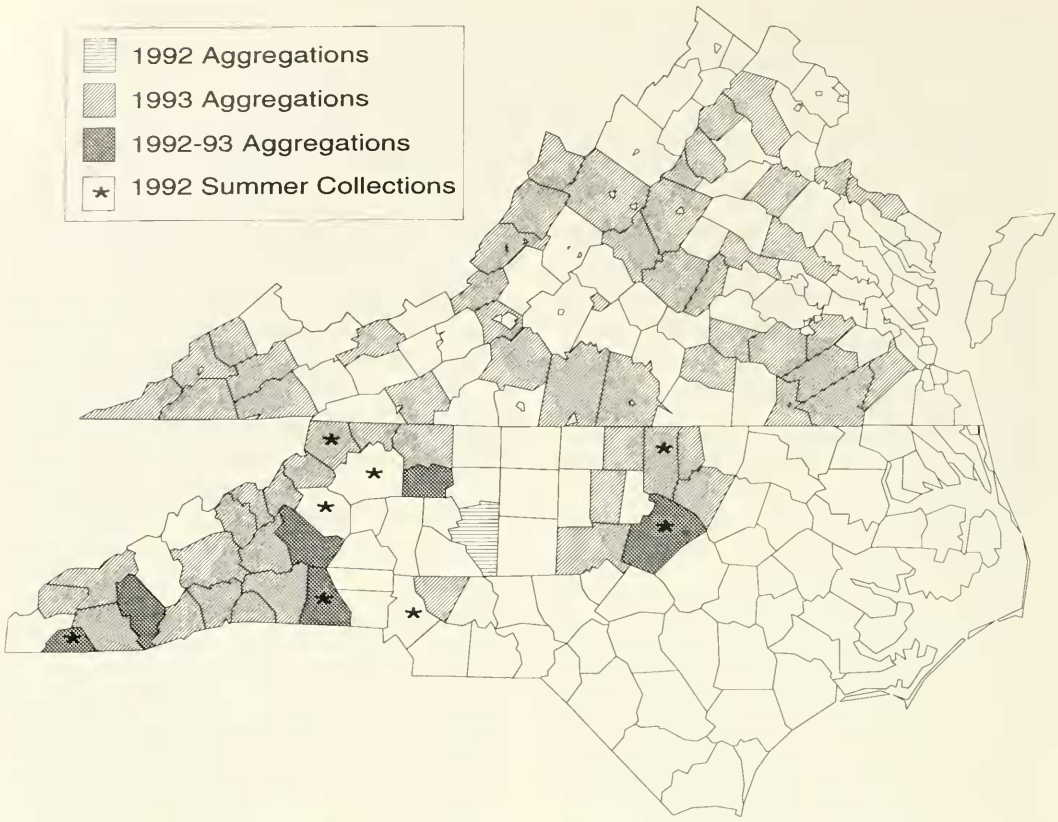

Fig. 1. Distribution of *Harmonia axyridis* Pallas in Virginia and North Carolina, 1992–1993.

overwintering sites. After the initial appearance, most of the beetles disappeared within a short time, but others were seen on walls or windows for several days, becoming active as the temperature warmed during the day. In Alleghany County, NC, a man was packing his car 17 October, which required periodic trips into his house. In an interval of about 15 minutes, the white doors of a two-car garage became covered with "20–40,000" beetles. He continued packing and watched the beetles. Within 1.5 hours, most beetles had left, but their ultimate destination was unknown. A few were observed inside the garage and on the outside trim 26 October. A woman in Henderson County, NC, described the activity as "like a swarm of bees" as the beetles left a stand of large white pines to the east of her house.

Beetles were most often found on light-colored walls and trim or on reflective surfaces such as large windows. Usually they were found on the southwest, west, or south-facing sides of buildings, which were the sunniest areas during the warmer afternoon hours. A few of the houses where *H. axyridis* aggregated were close to others in subdivisions or residential areas, but often were on a rise or hill and isolated with open spaces on one or more sides. Reported overwintering sites included: inside houses on vaulted or cathedral ceilings, under doorframes, in insulated attics, behind molded plastic shutters on houses, in soffit vents, and in root cellars. The beetles are able to get into small cracks and crevices, and undoubtedly overwinter in many other places, undetected. In Japan, *H. axyridis* reportedly over-

winters in many places including the cracks and crevices of rocks on mountains, with a tendency to go toward white or light colored objects (Obata. 1986. Kontyu 54: 218–223). Tedders and Schaefer (1994) showed that white traps were more effective at attracting this species than dark, less reflective colors. We observed a variety of plants associated with the aggregation sites, with white pines, loblolly pines, Fraser firs, and apple trees found most frequently.

This species is polymorphic with melanic and non-melanic forms (Komai. 1956. Advances in Genetics 8: 155–188, Ayala. 1978. Scientific American 239: 56–69). All *H. axyridis* collected in North Carolina were the non-melanic form, and elytral color varied from brick-red to brownish-yellow. Elytral spots varied in number from 0 to 20 and in size from small dots to large, sometimes fused spots. This supports the findings of Chapin and Brou (1991) in Louisiana and Mississippi, and Tedders and Schaefer (1994) in Georgia, Florida, Alabama, and South Carolina populations.

Since the first reports of *H. axyridis* in NC and VA, the lady beetle has become widespread across these states. We can only assume that it will continue to spread throughout both states within a few years. With its wide host range and preference for arboreal aphids, it has the potential to provide beneficial biological control, but its habit of aggregating inside houses and other buildings is viewed by many residents to be a nuisance.

Acknowledgments: We thank the numerous county agents of the Cooperative Extension Service who assisted in the collection of beetles and information and the many homeowners who shared anecdotes and allowed us to collect in their homes.

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Note Added in Proof

In the summer of 1994, adults of *H. axyridis* were found in cotton fields in the coastal plain (Perquimans County in the northeast and Onslow County in the southeast) of North Carolina. In the fall of 1994, aggregations were reported in the western two-thirds of the state, but activity remains highest in the far western counties. Based on the estimates of homeowners, aggregating beetles were more numerous than in the past.